$$\left[-\frac{6ab^2\pm 2b^2\sqrt{(a^2-8b^2)}}{a^2+4b^2\pm a\sqrt{(a^2-8b^2)}},\ -\frac{a^2b-12b^3\pm ab\sqrt{(a^2-8b^2)}}{a^2+4b^2\pm a\sqrt{(a^2-8b^2)}}\right],$$

the plus and minus signs to be used together.

$$y=\frac{8abx}{a^2+4b^2}+12b^3-a^2b+\frac{48a^2b^3}{a^2+4b^2+a\sqrt{(a^2-8b^2)}}$$

is the line through these points. The tangents to A parallel to $S'D$, $S'E$ are

$$y=\frac{2bx}{a\pm\sqrt{(a^2-8b^2)}}+\frac{a[a\pm\sqrt{(a^2-8b^2)}]}{2b}$$

This line meets $x^2=4by$ in

$$x_1=\frac{4b^2\pm\sqrt{\{16b^4+2a[a\pm\sqrt{(a^2-8b^2)}]^3\}}}{a\pm\sqrt{(a^2-8b^2)}}=r.$$

The tangent at this point makes an angle with the axis of abscissas whose tangent is $x_1/2b$. As this does not equal $-1/m$ the problem, as stated, is not true.

CALCULUS.

252. **Proposed by J. H. MEYER, S. J., Augusta, Ga.**

Supposing the arc of a semi-circle to be stretched out into a straight line, and an indefinite number of perpendiculars erected on it, each equal to the versed sine of the corresponding arc; what would be the length of the curve traced out by the tops of the perpendiculars?

Solution by CHAS. O. GUNTHER, Acting Professor of Mathematics, Stevens Institute of Technology, Hoboken, N. J.

Assuming a as the radius of the circle, the equation of the curve is $y=\text{vers}\ x/a$, and the required length of the curve is given by the expression

$$s=2\int_0^{\pi a/2}(1+\frac{\sin^2 x/a}{a^2})dx=2\int_0^{\pi a/2}\sqrt{(a^2+1-\cos^2 x/a)}\frac{dx}{a}.$$

Let $\cos x/a=\sin\theta$; then

$$s=2\sqrt{(a^2+1)}\int_0^{\frac{1}{2}\pi}\sqrt{1-\left(\frac{1}{\sqrt{(a^2+1)}}\right)^2\sin^2\theta}\,d\theta=2\sqrt{(a^2+1)}E(\frac{1}{\sqrt{(a^2+1)}},\ \tfrac{1}{2}\pi).$$

Also solved by G. B. M. Zerr.